



Ensuring Hydrometric Data is Fit-for-purpose Through a National Service Level Agreement

7th Global FRIEND Conference

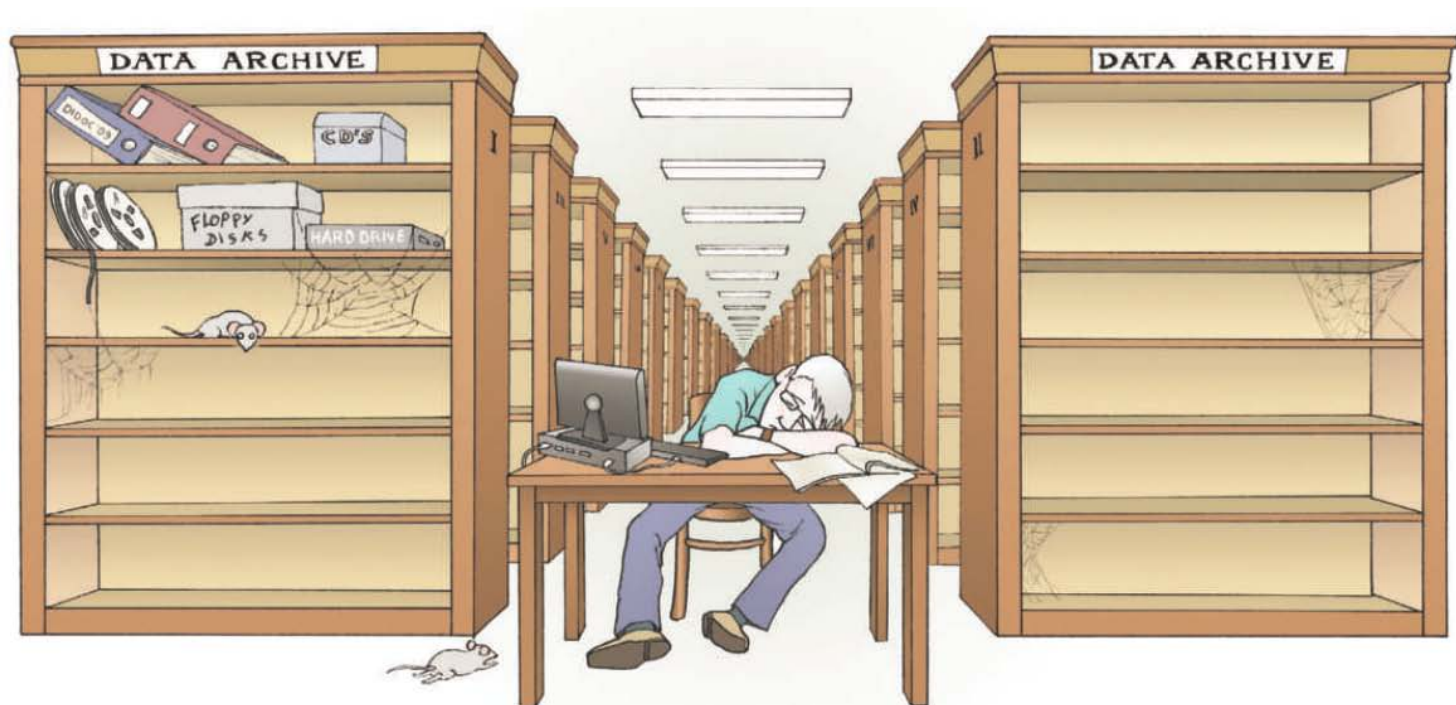
Montpellier, France, 7-10 October 2014

Katie Muchan and Harry Dixon

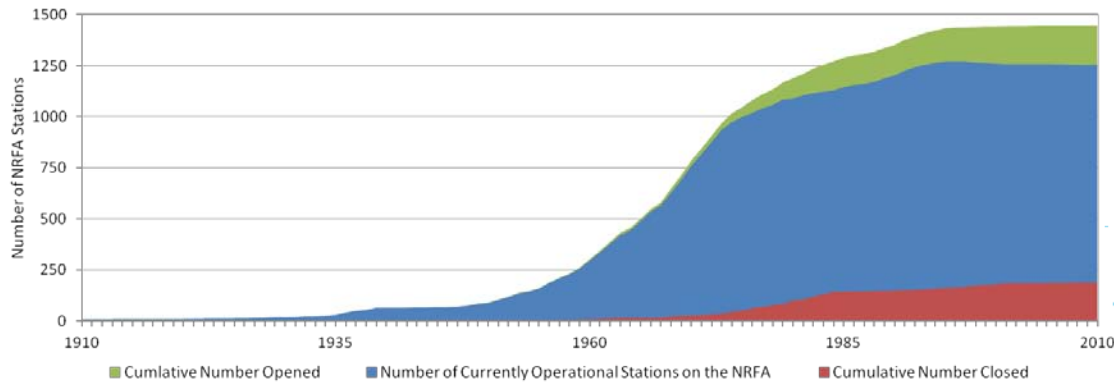
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Presentation Structure

1. Hydrometric data in the UK
2. Data problems
3. Setting up a Service Level Agreement
4. Result from the first 10 year
5. Conclusions and wider applicability



Hydrometric Data in the UK



- Dense hydrometric network
- Considerable growth in 1960/70s
- Main Network maintained by four public bodies
- **National River Flow Archive** collates, analyses and disseminates data
- Centralised support/ best practice advice for partner measuring authorities



Cyfoeth
Naturiol
Cymru
Natural
Resources
Wales

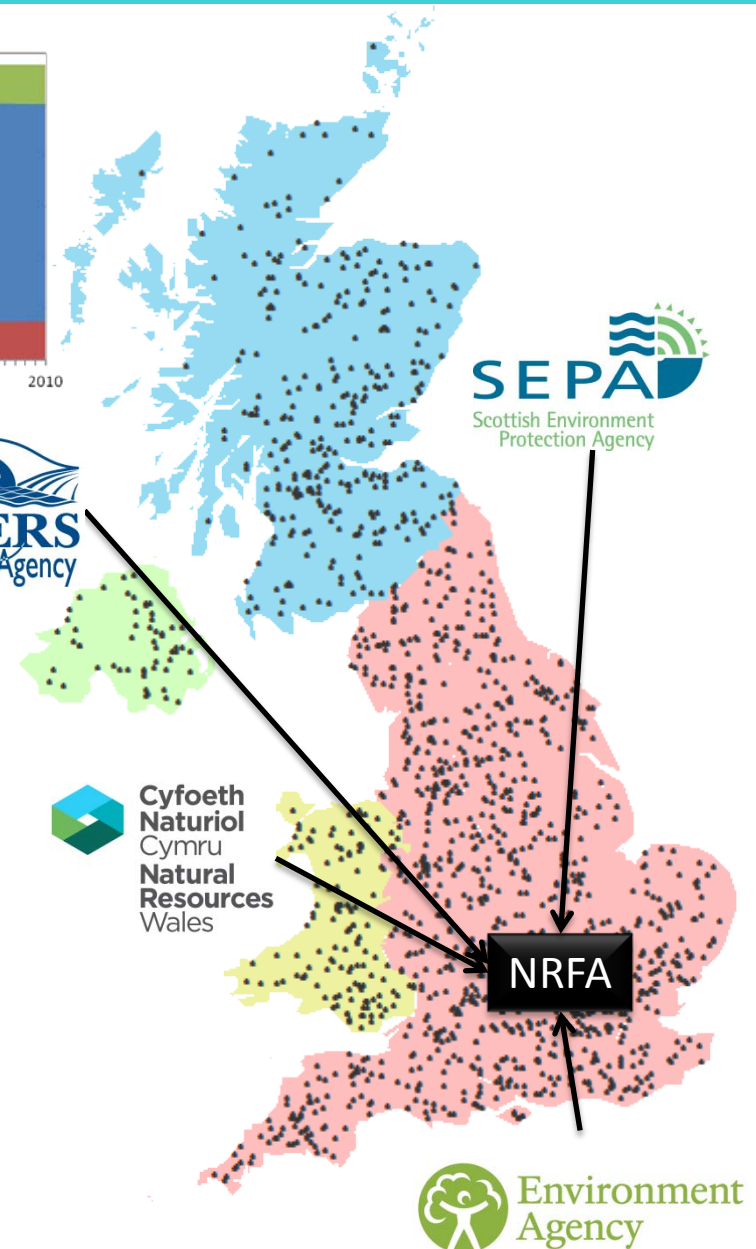


Environment
Agency

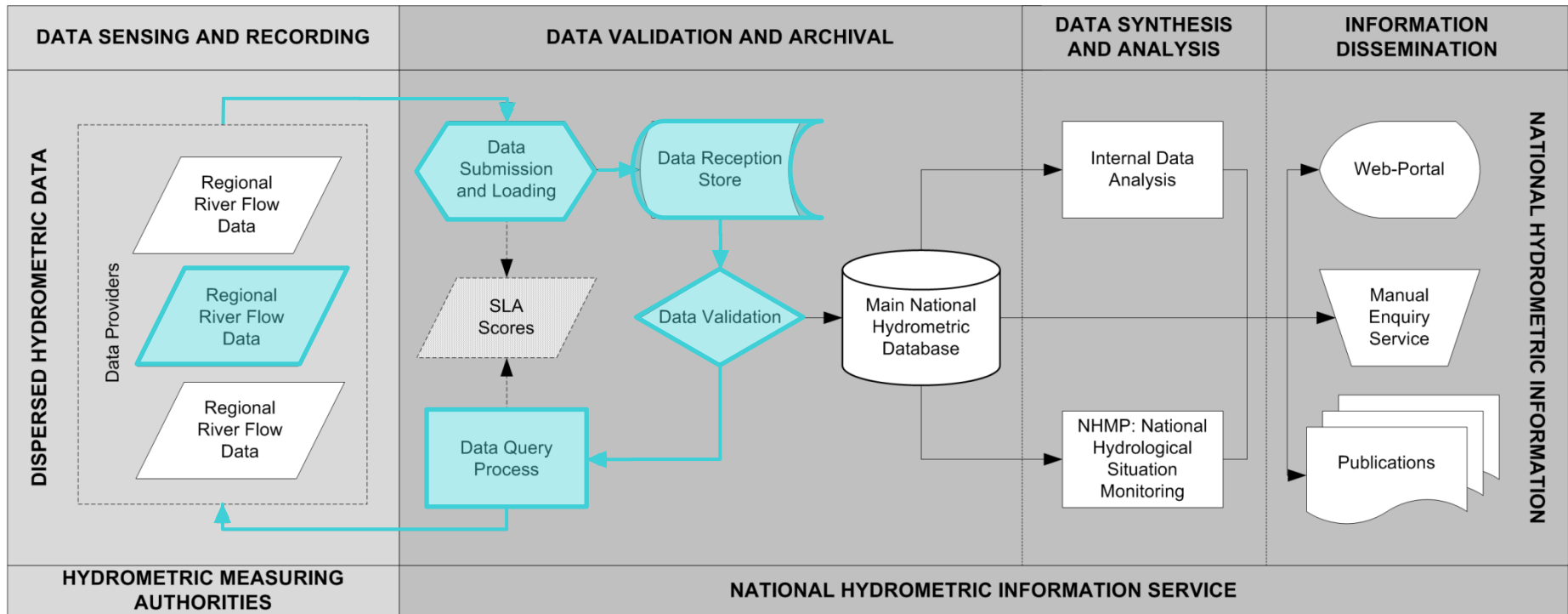


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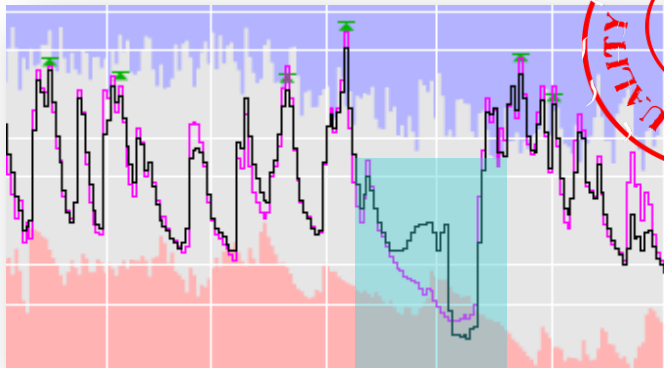
NATURAL ENVIRONMENT RESEARCH COUNCIL



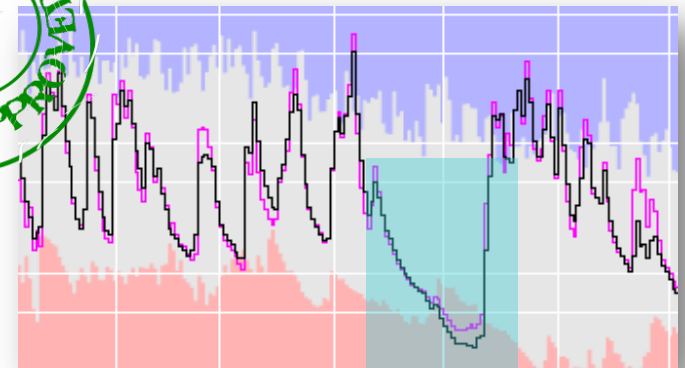
Data Acquisition



Initially submitted data



Corrected data



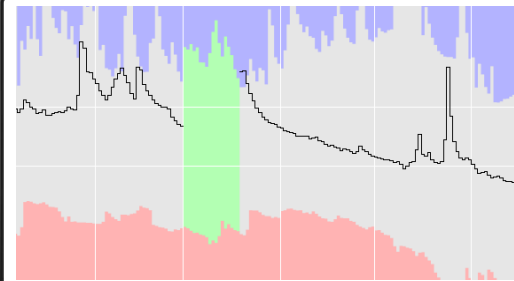
Structured Quality Control Procedure

Data Acquisition - Problems

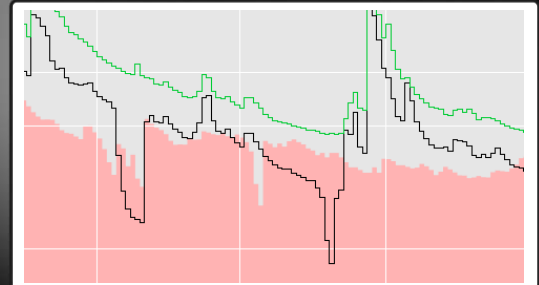


Empty.

**MISSING/LATE DATA
SUBMISSIONS**



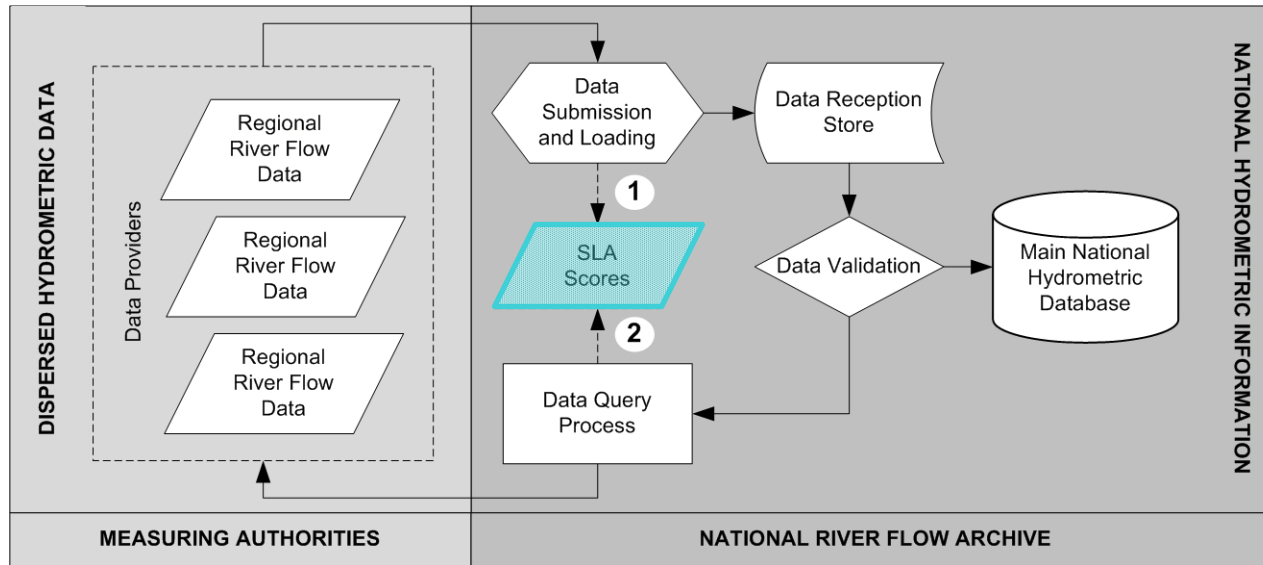
MISSING DATA



ERRONEOUS DATA

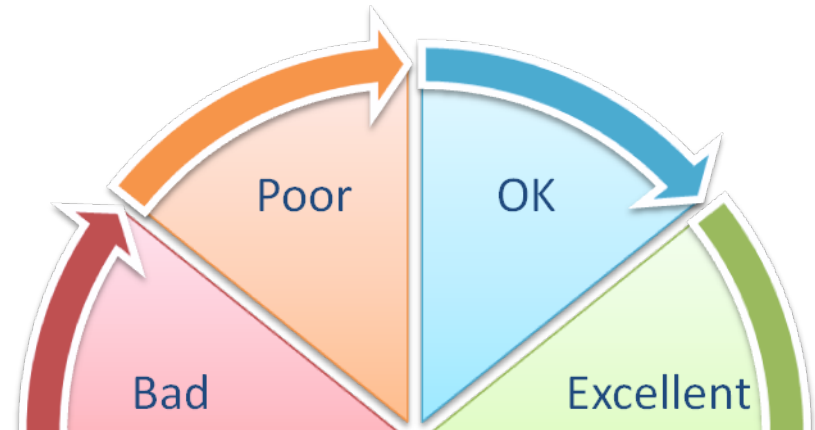
- 1990s: Common problems found in data submissions
- Concerns over data completeness and quality
- Impact on the overall utility of the archive for all users (e.g. research, water management, policy)

Data Acquisition – Service Level Agreement (SLA)



- SLA introduced in 2002 to control flow of data to the archive
- Key performance indicators calculated on all data submissions for:
 - data provision
 - data completeness
 - data quality

Data Submission Time	Number of days a submission is late
Flow Data Completeness	Number of missing days of flow data
Station Completeness	Percentage of stations with a complete year of data
Individual Station Data Quality	Number of flow values where valid queries are identified
Network Data Quality	Percentage of stations where valid queries are logged
Query Response Time	Time taken to response to queries



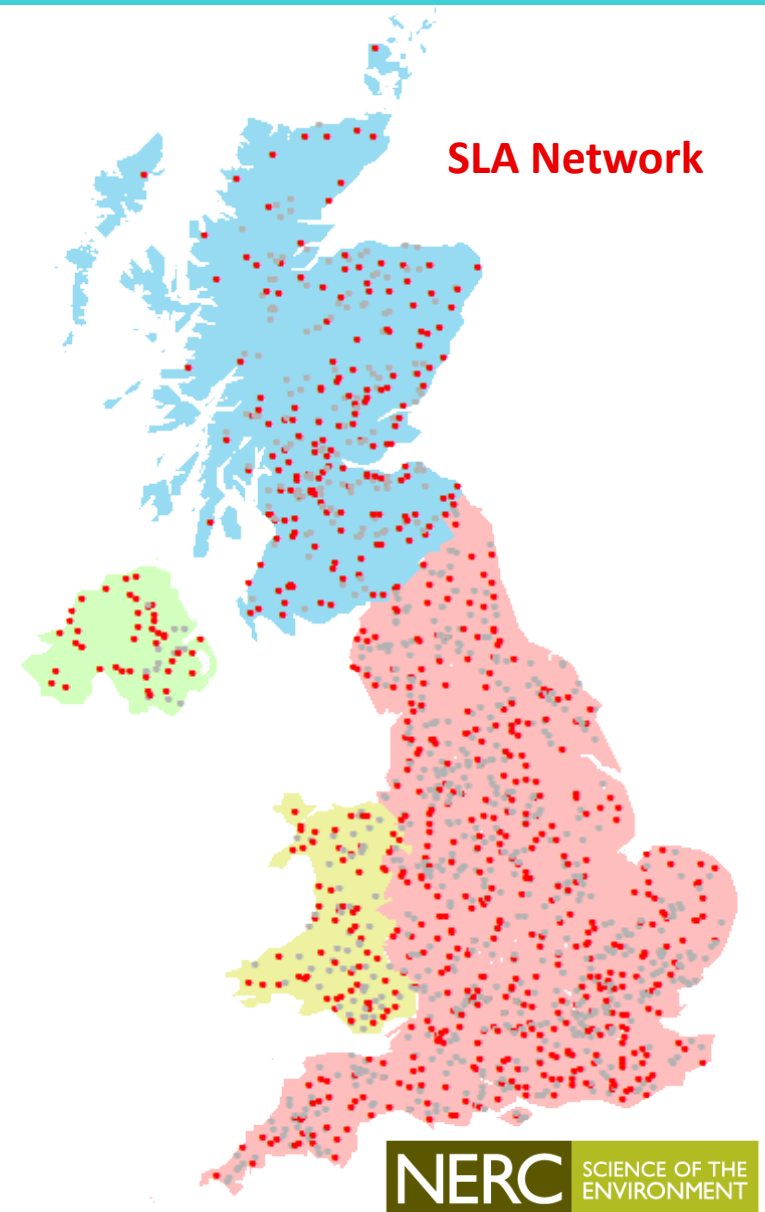
Data Acquisition – Service Level Agreement Network

SLA Network

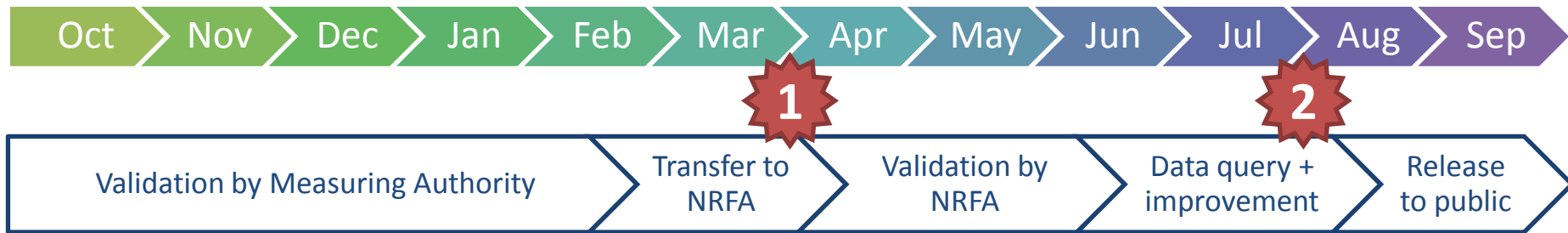
- Second aim to stabilise a changing network
- SLA only applied to a subset of national network
 - 711 stations (~ 50% of UK network)
 - Strategically valuable stations
- Network forms the focus for quality control

Performance Reporting

- Performance indicators aggregated to regional/national Measuring Authorities
- Reported to management teams to inform future prioritisation



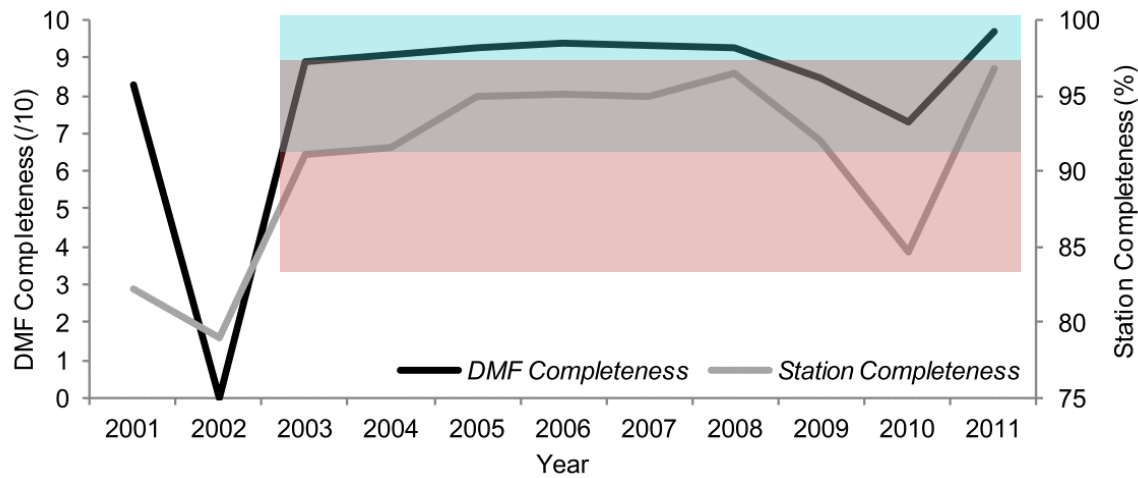
Measuring Data Provision



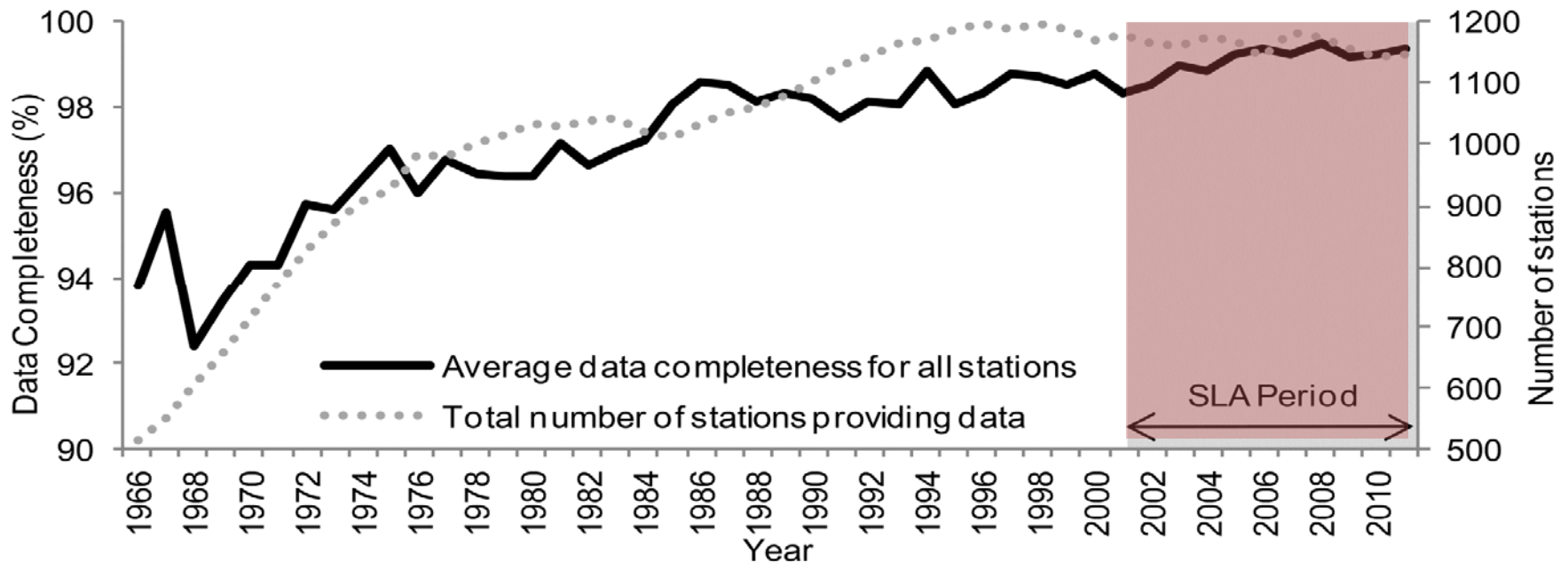
Performance indicators designed to ensure prioritisation of data provision.

- 1. Data Submissions:** All data now submitted to the archive within 10 days of agreed deadline (80% on time)
- 2. Response to Queries:** 68% within agreed window. Complex issues may take longer to solve.

Measuring Data Completeness

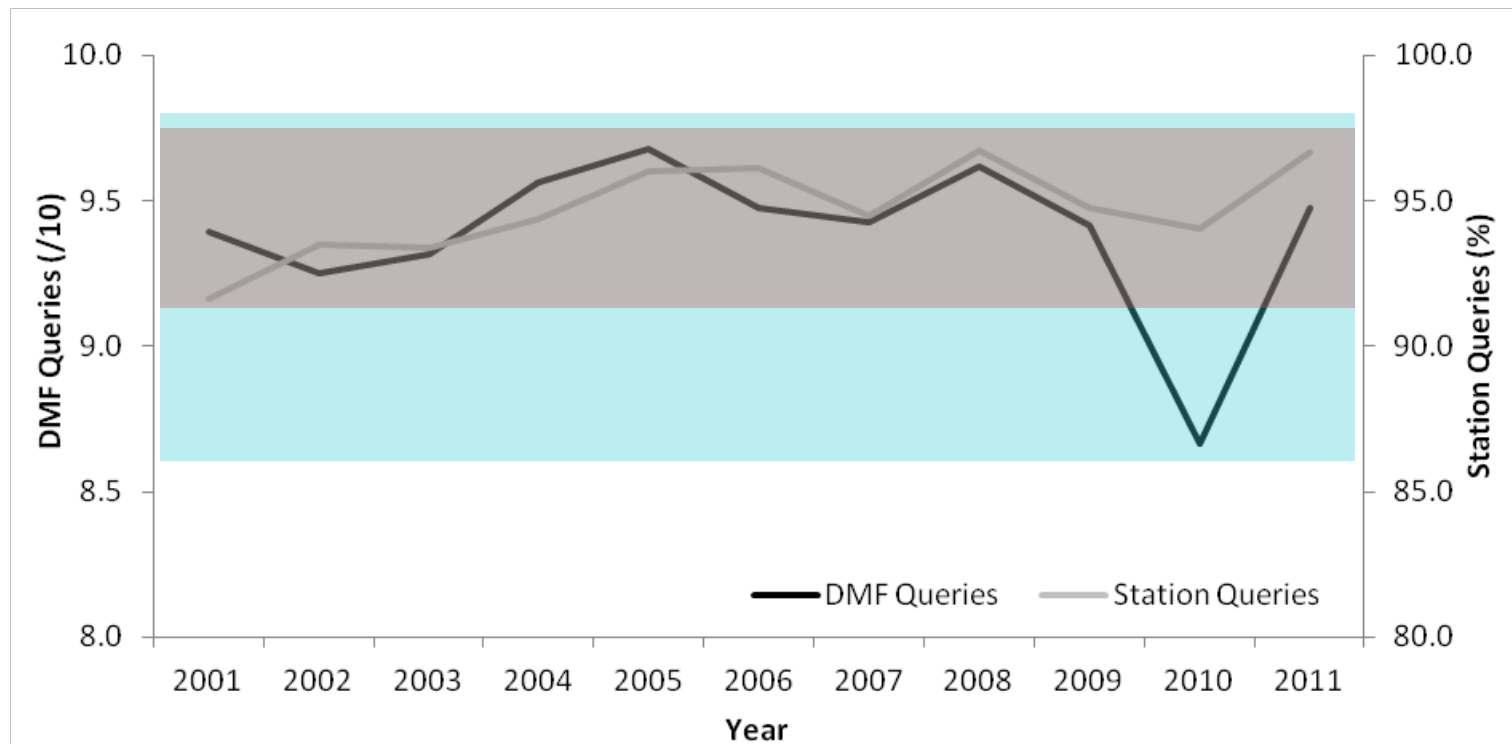


- $\approx 1\%$ of data is missing
- Spread across 4-10% of the network

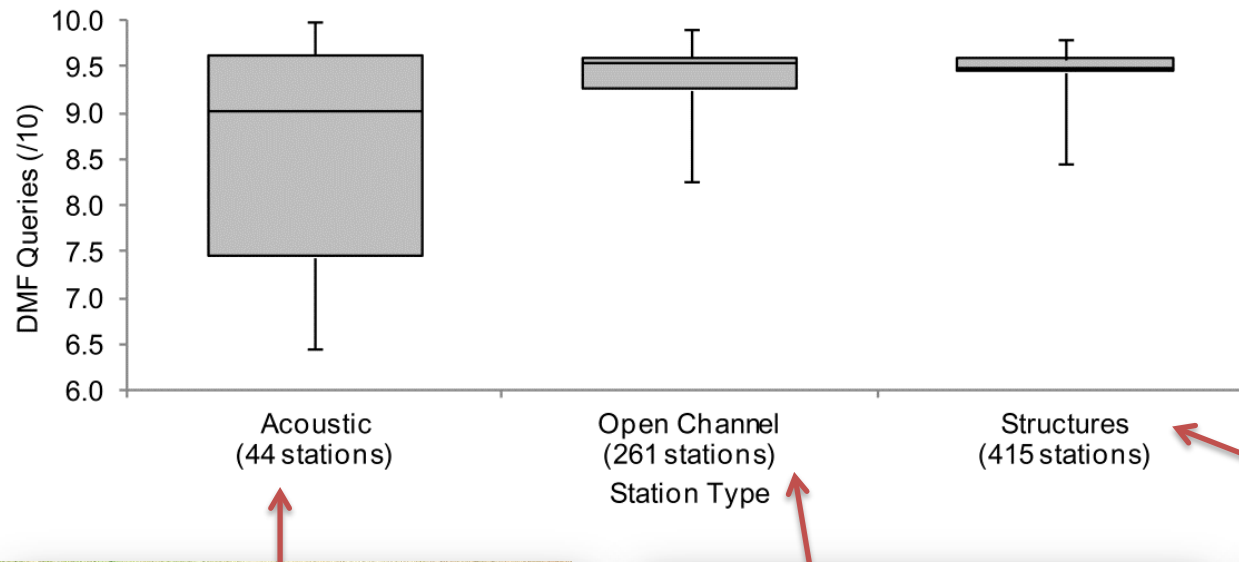


Measuring Data Quality

1. Strong overall performance of the monitoring network:
 - 98.5% of data submitted have no valid queries
2. Where problems are observed in data increasing trend for these to be spread over smaller proportion of the network



Measuring Data Quality



- Increase in number of stations using ultrasonic or acoustic doppler technology
- Generally higher number of data issues identified at such sites



Overall Utility of the Service Level Agreement

SLA has:

- Ensured provision of data to the national archive remains a priority for distributed teams, across multiple organisations;
- Improved and stabilised data completeness across the network;
- Targeted improvements in data quality towards strategically valuable stations.

= *Fit-for-purpose data*



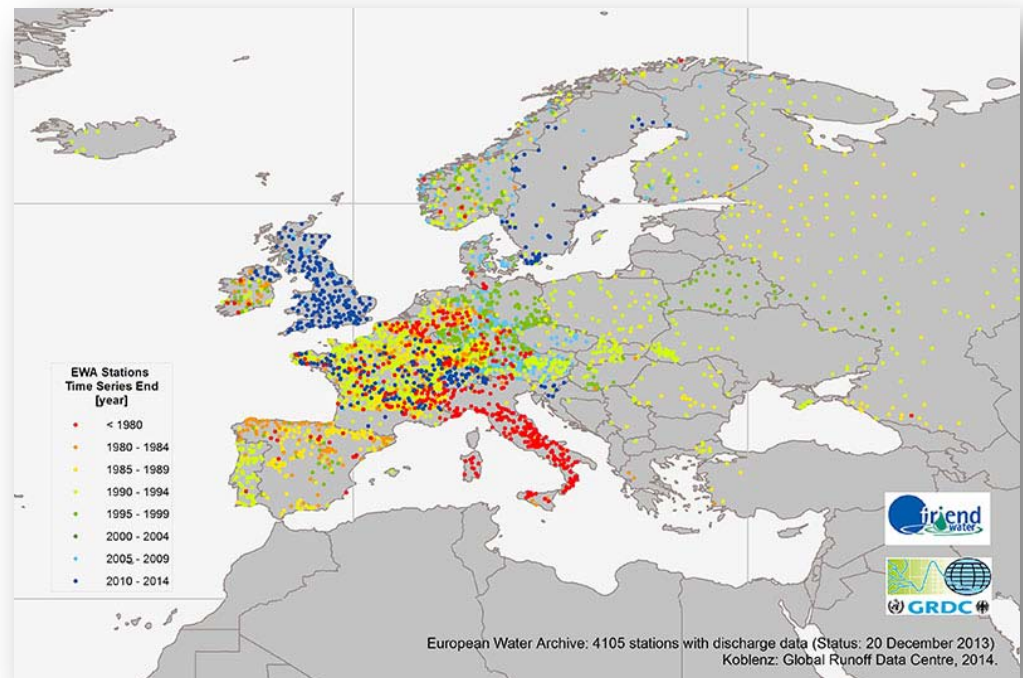
Conclusions and Other Applications

Conclusions:

1. Data from multi-organisation monitoring networks can be effectively combined using structure data provision and quality control frameworks.
2. Service Level Agreements and quantifiable Performance Indicators can help control such systems and improve the utility of data centre.

Future applications:

- Application to federated data centres
- International data exchange



Dixon, Harry; Rodda, John; Jenkins, Alan; Demuth, Siegfried; Looser, Ulrich. (2013) **Sharing water observations: turning local data into global information**. In: Griffiths, Jacqui; Lambert, Rebecca, (eds.) *Free flow: reaching water security through cooperation*. Paris, UNESCO, 304-307.

<http://digital.tudor-rose.co.uk/free-flow>

Dixon, Harry; Hannaford, Jamie; Fry, Matthew J. (2013). **The effective management of national hydrometric data – experiences from the United Kingdom.**

Hydrological Sciences Journal.

[10.1080/02626667.2013.787486](https://doi.org/10.1080/02626667.2013.787486)



Photo – Nick Everard, Environment Agency

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